AMIGA: THE VIDEO NATURAL

BY CHRISTOPHER KOHLER

There are a number of excellent reasons why this series of personal computers is the favorite of many production professionals.

The Amiga is widely acknowledged as an excellent microcomputer system for video use. In fact, independent research (Sheer & Chaskelson, *PVM IV* 1990) reports the Amiga as the overall leading system across a number of application categories within the professional video industries today. This is as compared to both dedicated video devices, as well as microcomputers. There are specific reasons for this broad adoption of the Amiga as a preferred video system.

The Amiga is the only microcomputer that was designed and built to be especially video oriented. This means that, as a system, it has integrated both video and computer technologies. Usually, computers and video devices have two very different methods of handling signals, images, sound, and information.

A set of proprietary "custom chips" that Commodore designs and manufactures is installed in every Amiga. Along with the central processing unit (CPU)—the "brain" of every computer—these specialized Amiga chips work like "extra brains," dedicated to such tasks as display, graphics, animation, audio, and various computer processes. This results in the Amiga's special features that perform in several ways beyond the standardability of other microcomputers.

Additionally, the Amiga contains other hardware and software features that are unique and that can translate directly into real benefits in specific video applications. It's useful to understand a number of these features in order to appreciate what benefits they provide to video use.

One key area is in the Amiga's display signal. Unlike most computers, the Amiga outputs an NTSC-video compatible signal. This means that your computer output is much closer to matching the qualities and requirements of video signals, so that the two may be combined easily and effectively. This "compatability" can be understood by examining several specific aspects.

For instance, the Amiga's display signal outputs a 15.75 kHz horizontal scan rate. This matches the horizontal scan rate of NTSC video. Most popular microcomputers produce scan rates of perhaps 30-60 kHz or faster. This means that they require scan conversion to force the signal to the rate of video. This is typically done through the use of additional devices. A quality scan convertor, alone, can cost several thousand dollars. The Amiga avoids this entirely.

The Amiga also produces an interlaced display, once again providing what is needed for video. Most computers do not have the ability to interlace. They require some external in-line device, or possibly an expensive internal card to alter their signal to interlace.

Computers typically produce a digital signal, since computers process information digitally. NTSC video is, however, an analog signal. The Amiga outputs an analog signal as well. Another very important feature for video use, especially when combining graphics, is overscan. Usually, a computer displays all images on a screen with a border around it. In other words, you can see that the images do not fill the entire visible area of the monitor screen. Yet, when watching video or television, you can notice that the image extends all the way to the visible edge of the screen and beyond.

The Amiga: real benefits in specific video applications.

This fundamental limitation of computers is an outgrowth of early computer design, when only text was displayed. It was meant to keep text in a confined area so that it would be easier to read. This technology, however, prevents graphics from being displayed all around the edges of a video screen. In video use, this can be a severe limitation, since titles and graphics can't be moved in and out of the edges of the screen. Conversely, a graphic mask intended to cover the entire screen will only float in the center of the screen with the video

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showing all around its edges.

The Amiga is the only microcomputer that has built-in overscan capabilities. It's often simply a matter of clicking on a button in software programs in order to use overscan, and may be definable, as well. Other computers demand some form of additional hardware modification of their images in order to achieve overscan. Unfortunately, beyond the expense, some methods may simply stretch the image, which could distort it. Finally, the Amiga display is at a 4:3 aspect ratio, which matches that of video.

These qualities of the Amiga's display signal comprise the video compatibility, and this signal is delivered through both an external computer-type port (useful for monitors and some specialty equipment) as well as another unique Amiga feature, an internal video expansion slot. Whereas many computers have slots inside for adding plug-in cards—for such things as additional memory or controlling hard drives—the Amiga was the first and only computer to include a dedicated slot for video use.

This slot delivers the video-compatible signal directly to a variety of devices that may be installed right within the Amiga, and allows them access to the internal powers of the system. This is not only convenient and efficient, but it also makes it possible for unique, specialized products to be developed and used with an Amiga. For example, the Video Toaster expansion card, from NewTek (see this month's Conversation), was able to be created because of the Amiga's video slot and other proprietary features. Genlocks and special graphics cards may also be used.

Graphics is one of the most important application areas of computers in video. The most widely popular and valuable forms of graphics are character generation (text and titling) and paint (illustration, graphic design, charts, diagrams). In order to produce these graphics with a computerized system, it must be able to generate, manipulate, and output color graphic images in a form appropriate for video.

In recent times, more microcomputers are including some degree of graphics and color capability. Typically, these computers are very limited in their graphics ability as they come out of the box, with perhaps only 8 or 16 colors and one resolution mode. Often, one must buy additional graphics cards in order to enjoy more graphics power or a larger range of colors. The more powerful graphics cards can easily cost a couple thousand dollars and may require further memory or other resources as well. They often impose limitations of their own, such as compatibility problems or restrictive file formats.

The custom chips of the Amiga provide over 4,000 colors as a standard feature in every Amiga. Also, the Amiga includes the ability to display a range of resolutions, although for video purposes it can be useful to remain close to the resolution of actual video display.

Computers involve a trade-off between resolution and number of displayable colors because of the resource demands that graphics call upon within a system. The Amiga's integrated ability to not only perform a large color range, but also a resolution range as a fundamental feature allows the user to easily choose the preferred balance of the two.

It is fairly common to hear computer graphics products referred to in terms of offering over "16 million colors" and "high resolution." But it's important to realize that in many cases as few as 256 colors can actually be displayed on screen at once. And, in higher resolutions, it's often as few as 16, or even 8. The Amiga can display all 4,096 colors on screen at once, in more than one resolution (including overscan), which allows much more realistic images and creative options. Of course, additional cards are available for the Amiga, too, which can provide 16 million colors and even higher resolutions.

Animation can be a highly effective—and particularly valuable—addition to videographics. Again, the Amiga system, with its custom chips, provides especially powerful abilities. One of the highlighted results is known as real-time animation. This is the ability to create and run animations on the system at the speed that the animation is intended to display. Naturally, for video use, this would require up to 30 frames per second.

Many computer systems simply do not have the ability to play animations smoothly at this kind of speed. This is even more often the case when combining audio and other processes. In fact, for some systems to produce quality animations they must output each single frame, one at a time, to videotape before they can even be viewed. Obviously, this can be a serious limitation in creating animations. The time and equipment involved to merely check one's progress may very well be prohibitive in terms of both time and cost. Although simpler animation effects may be accomplished at lower resolutions—with fewer colors or at speeds that are slower or jerky—they may not be of acceptable quality for many uses.

The Amiga provides smooth, real-time animation abilities so that an animation may be played and checked during its creation. Speeds are easily definable. And animations may use all 4,096 colors—including sound.

This standard feature of the Amiga has stimulated the development of a remarkable selection of animation software. Even Disney has released an animation program exclusively for the Amiga, which incorporates a traditional-type method of cel animation. There are surprisingly affordable programs, easy to-use programs, many animation utilities and tools, and the inclusion of animation options within other types of programs that ordinarily may not have this option, such as character generators, paint programs, and a growing collection of multimedia and presentation programs.

Beyond the importance this holds for animation creation, it also adds another valuable option: the ability to record to tape in real-time, as well. By playing an animation directly from the system to a VTR it becomes very efficient and cost-effective to produce a wide range of animations, either alone or overlaid and combined with video images.

This extends and simplifies the process, which allows animation to be quickly and easily used in projects that otherwise might not be able to benefit from the slower, more expensive, and cumbersome methods. Also, for the cost-conscious, it avoids the necessity of expensive single-frame recorders. And, finally, this real-time playback is ideal for showing animations to others for approvals, or recording it quickly to tape and sending it anywhere overnight.

At the same time, for the highest quality and certain effects, the Amiga also offers the option of single-frame recorded animation, using the same kind

of additional equipment other systems do. This includes the most advanced kinds of rendering, including 24-bit (16.7 million colors).

Three-dimensional imaging, whereby the computer assists the creation of 3D objects that can be arranged in scenes that include light sources, multiple objects, and even ground and sky is a very advanced form of computer graphics. It's historically been a rather expensive and complex one, as well.

The Amiga has been a leader in the microcomputer revolution of delivering practical, quality 3D imaging for unprecedented affordability and ease-of-use. This includes a variety of rendering techniques, meaning that the computer will actually draw or paint the image on the screen. This can produce very impressive, realistic-looking images. These 3D objects and scenes can also be animated, which results in some of the most sophisticated kinds of videographics such as those popular flying logos, station IDs, product simulations, and more.

These types of graphics are processor-intensive, since they involve an enormous amount of calculation. The Amiga's processors, however, including the math coprocessor found in the A2500 and A3000 models, accelerate the process quickly enough to make this manageable.

As described above, the Amiga's ability to generate images with 4,096 colors makes it possible to optionally render 3D animations in this mode, which allows for real-time play on the system. It's also available to output single-frame, as well.

The Amiga was the first and only microcomputer system to achieve genuine real-time multitasking, supported by both hardware and system operating software. This is the ability for the Amiga to run more than one program simultaneously, with each program continuing to be active and productive. Other systems have managed to add a visual user interface, with the appearance of multiple programs running. Or they may be able to launch small utility programs concurrent with other main applications, but for practical purposes it's most likely a relatively difficult and/or expensive proposition to actually accomplish anything like the Amiga's standard multitasking.

This multitasking power adds a meaningful dimension to the Amiga in a number of particular video-related functions. For editing, an Amiga-based system may be able to control up to 32 independent devices. Obviously, a multitasking system will best be able to operate numerous devices and processes. Also, innovative programs are developed for the Amiga, which are designed to take advantage of this system performance feature so that very sophisticated and advanced programs are possible. We see this in the Amiga's array of multimedia programs, which can each manipulate several elements simultaneously: graphics, animation, audio, video, and more. Finally, multitasking can boost productivity, since one can continue using the system, even as it automates other processes. For instance, the Amiga could

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be generating an animation in the "background" while also transferring information over a phone line. With all of this going on, you could continue to write a script on the same system.

This same power and versatility that the Amiga delivers for both specific videographic and production kinds of tasks should not be overlooked in terms of general computing utility. Pre-production work, such as scripts and storyboards, can benefit from the Amiga's native graphics and fine performance. Text and graphics can be easily integrated into color storyboards and project development materials. Even animatics can be quickly produced and printed or recorded toward producing more ambitious productions.

Databases that include video images—even audio clips—can be crafted to track and log video productions, resources, and information. Spreadsheets and financial accounting packages are dynamic assets for video businesses, along with the day-to-day computerized benefits of word-processing, telecommunications, and desktop publishing of so many business documents and materials. Many of even the most mundane types of programs sport surprising special features and useful options as a result of the Amiga's unique abilities, which enhance their use.

The Amiga's essential video nature makes it the one most complete system appropriate for all of these applications, providing the video professional with the most practical and balanced mix of features, performance, and value in the entire range of functions typical to video work. For this reason, as well, a valuable selection of video-oriented software and hardware products continue to be developed for the Amiga in its video applications. This all adds and extends service, while reducing equipment, saving money, and avoiding tricky technical issues. □

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AMIGA'S VIDEO HISTORY

BY PETER LULLEMANN

Consider the evolution of the personal computer. The earliest of these were designed and used primarily for number crunching, information storage, and other forms of data manipulation. The first personal computer display technology was designed simply to present data for the user in monochrome. Output technology didn't have to go very far to match what the computers could generate. Then graphic-oriented computers became available. Although still monochrome, the Macintosh sparked a new industry with desktop publishing. The display technology had to be upgraded as well as the output technology.

At about the same time that Apple was making desktop publishing a household phrase, Commodore's Amiga computer arrived on the scene. The Amiga design incorporated a number of innovations, including color output and a true multitasking operating system. At this point the display and output technologies fell behind. The expense of using traditional PC monitors to display all 4,096 colors would have been prohibitive for most of the people that the Amiga's designers predicted would buy the new computer. An inexpensive alternative was to add circuitry to allow users to connect their Amigas to video monitors. What initially began as a cost-reducing measure later became a key feature of the Amiga.

Color, multitasking, and video output came together in the Amiga with synergistic results. Amiga users began to explore their own creative, graphic capabilities and wanted more. Third-party hardware and software developers saw new markets and began to produce products that capitalized on the unique features of the Amiga. As more and more products became available for this unique personal computer, people began to demand even better products. To a degree, as the users' sophistication grew so did the sophistication of the products. Each step built upon the last until the Amiga, used with the right equipment by professionals, has become one of the only true multimedia computers.

It should be noted, however, that when the Amiga was first introduced the majority of its buyers were not professionals. They purchased it for casual home use, which had a number of positive and negative effects. First, the developers of products for the Amiga saw a demand for more sophisticated products from an audience that was not prepared to pay very much for them. In some cases this forced Amiga developers to design impressive hardware and software that sold at ridiculously low prices. It also led to some disastrous cost-cutting measures that effectively crippled some marvelous technological innovations. Another by-product of the Amiga owners' budgets and casual use of the products was that developers felt that they had to use a casual, friendly, and sometimes cutesy approach to naming and marketing their products. For several years this made some professionals wary of investing in Amiga equipment.

The overall results of this strange mixture are a wide variety of peripherals and software that range from the dreadfully amateurish to the unbelievably impressive. This article's purpose is to sort out fact from hyperbole and give some honest, professional evaluations of the products available for using the Amiga in a video environment.

Why is the Amiga an ideal video computer?

As mentioned earlier, the Amiga video output circuitry in the basic design, was initially a result of cost-cutting measures. The fact that video output was built-in from the very beginning, however, gave the Amiga a number of advantages. Many other personal computers must go through conversion of the video signal even before it can be encoded, and this process adds distortion, not to mention extra expense.

Amiga's multitasking operating system allows the user to run more than one program at a time, which means that the Amiga can be used for a number of tasks simultaneously. Although trying to have the Amiga do everything may not be the ultimate solution, it does mean that

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overall use of the computer in a working studio environment is more efficient. It also has allowed developers to design applications that let you view your results in real time, rather than having to guess at the final outcome.

Today the graphics and video products developed specifically for the Amiga have reached a point where they can be considered serious tools by the video professional. Developers, driven by a very cost-conscious market, have produced products for the Amiga that retail for only a fraction of the cost of similar products on other platforms.

The Amiga provides a number of features, peripherals, and software for the video professional at a substantially lower cost than can be found on any other system. The computer is powerful and yet relatively easy to learn and use. It was designed to support video from the very beginning.

Although a large number of video professionals use the Amiga, there are those who have yet to discover its value. The answer to why this is is complicated, and yet most of the reasons lead back to the original Amiga buyers. Because it wasn't originally marketed to the professional the only people who even knew of its existence were Amiga fanatics.

The Amiga is widely used by professionals such as Richard Basch Studios, Washington D.C.

Other reasons included the perception at that time that Commodore addressed the lower end of the personal computer market, and that they were heading in two directions at once with the Amiga. On one hand they were trying to push it as a high-end, powerful graphics machine; on the other hand they were scaling the Amiga down as a home, hobby, and family entertainment computer. This was reinforced by the game manufacturers who saw the Amiga as an incredibly powerful development platform. Many game developers do their original products on the Amiga and then convert them for other computers because the Amiga is at the top of the line and everything else is either slower or has fewer graphic capabilities.

Reluctance by larger, higher-end companies to develop for the Amiga platform left the door open for smaller firms to seize the Amiga opportunity and become quite successful, some eventually branching out onto other platforms. The eventual change in attitude toward the Amiga has meant that more and more professional equipment has been modified for it, and that some of the smaller Amiga companies have developed interfaces for the high-end units.

THE AMIGA AS A 3-D SYSTEM

The first 3-D video animation programs on a personal computer were created on the Amiga, again because of its incredible graphics capability. Over three years ago, which is a long time in computer terms, programs like Sculpt-3D, from Byte by Byte, appeared on the market and were quickly followed by many others. Some were crude and clumsy to deal with, but by trial and error we now have a system on the Amiga that can truly be called professional.

Let's look at the Imagine 3-D animation rendering system, from Impulse Inc., of Minneapolis MN. For the ones who have already worked in 3-D here are some of the features that make this software outstanding: many "high-end" features previously found only in much more expensive machines, like the Wavefront; features like "magnetism," which gives much more flexibility when manipulating objects and points; extrusions along paths; good texture mapping capabilities, including brush mapping; flexible object linking; animations rendered in many different display formats; the action script editor, a very clear way to choreograph movements, transitions, light sources, and effects; Imagine's ability to segment what frame you want to

(continued on page A19)

Off Betacam SP video image.

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There are a number of high-end professional units that work with the Amiga today and produce spectacular results at a fraction of the usual price. As with any computer, the Amiga can't solve every problem. But there are a number of production challenges that the Amiga, when linked with the right equipment, can solve if you know what you are doing. Some Amiga products are still not suitable for professional use (even if they are promoted as such), but there are just as many pieces of equipment and software that might just be the ideal solution you are looking for.

Incorporating the Amiga into a video system

One advantage of using the Amiga is that it can perform a number of diverse tasks. There are a number of professional-quality peripherals available for the Amiga—frame buffers, 3-D paint and modeling programs, 24-bit video boards, character generating programs, scanners—and I will try to give specific examples of the good ones. The general rule, however, is that you can not expect one board or piece of software to do it all.

One of the mistakes that many people make is trying to do too many things with one computer. A better approach is to have dedicated systems for each specialty—for example, one system for character generation and another just for painting. The Amiga is so modestly priced that certain users could conceivably afford to have more than one.

There are some cases where specific pieces of equipment for the Amiga are not compatible with others. If you are on a tight budget you may have to go through the trouble of changing boards when you want to change uses, but this is far from an ideal solution. You must first analyze your specific needs and build an Amiga system that fulfills them.

For example, if you are planning to use the Amiga primarily for 3-D rendering or 24-bit image applications then you must start out with a few basics. First, you must have a way to calibrate your monitors. The images may look wonderful on your studio monitor but if your monitor is not properly adjusted then those same images will look terrible everywhere else. Second, every video computer is capable of producing illegal video colors, and there is no way that you can see this without a waveform monitor and vectorscope. Third, 3-D rendering and 24-bit images consume vast amounts of processing time, RAM, and disk storage. This means that you should invest in an Amiga with a minimum of 5 MB of RAM (some 24-bit boards require 7 MB minimum), a 68030 CPU to speed up processing, and a mass-storage device (it isn't even possible to store a complete 24-bit image on a single floppy disk). Finally, once you have generated your images you have to put them on videotape and that means buying a good encoder or transcoder and the right VTR. □

Peter Lullemann is president of Philadelphia Video Lab (PVL), which specializes in research and extended definition hard copy from videotape. All images accompanying his articles were transferred to film by PVL.

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MERGER OR MYSTERY?

BY RAY M. UNRATH

The merging worlds of personal computers and professional video have created some mysteries in the minds of video professionals. Amid this integration, one should remember that "computer video" display does not necessarily mean the same thing as "television video," and that there are differences between the various makes of personal computers. For this article, let's confine ourselves to video, or specifically the raster scan rates of TVs, most PCs, and the Amiga. How do they merge into a teleproduction studio? (In the interest of brevity, some of the following may be oversimplified, and certain specs will be in round numbers.)

With only *one* exception, *all* makes and models of "low-cost" personal computers output videographics in a sequential scan raster format—not 2:1 interlace, and certainly not at the TV specs of 525 or 625 lines. So how can they work in television? In all cases, add-on hardware/software provides in essence, a "standards converter." The one exception is the Commodore Amiga.

Every model of Amiga ever produced (from those priced at less than $1,000 to about $3,500) offers television's 2:1 interlace scan rates. How did they do it? They designed it that way from the beginning. First they chose a computer clock rate of 7MHz, typical of many PCs (although, as with all brands, versions are available with accelerated clock rates to about 30MHz). But here's the secret: All Amigas have an internal crystal-controlled oscillator that produces a 28.63636 MHz clock. Divided by 4, this equals the 7MHz *computer* clock. Divide by 2, and it equals 14.31818 MHz, the *television* "magic numbers" from which subcarrier, horizontal (H) scan rate, and vertical (V) scan rate are derived. Similar conversions occur in PAL.

Of course, supplementary hardware circuits and software, all standard, enable the Amiga to directly conform to the world of television standards right out of the box. As stated, now we are "enabled," but it takes a bit more to fully integrate into teleproduction situations. Mandatory is a genlock, which must be specifically designed for use with an Amiga. Amiga designers were kind (or thoughtful) enough to bring their 28MHz tool to an external connector, as well as being part of the internal bus structure.

When a genlock is connected, the internal 28MHz is turned off and the genlock takes over—a very critical and sensitive function. Don't forget, the computer requires this clock at *all* times, or it will crash, which you don't want to happen in a teleproduction environment. Bear in mind that the primary function of an Amiga genlock is to control (or shift) the frequency of the 28MHz clock, so that the divided down H and V rates conform to the incoming video or black burst timing. When non-synchronous video inputs are switched, the 28MHz shifts instantly, and the computer must not crash. Amazingly, a well designed genlock can track a non-time-base-corrected VCR video input, constantly shifting the 28MHz, and still maintain the computer's integrity.

It should also be noted that the term *genlock* commonly used for the Amiga is a misnomer, in part. All such devices include an encoder, because the computer produces only RGB. Some designs may also include Y/C or "S" encoding/decoding. Video-quality sync waveforms and levels are not a forte of computer design, nor is low signal-to-noise ratio. Also, a genlock will often include other video functions such as keying, mixing, and fading. In summary, overall functionality, stability, and quality of design are very important considerations in addition to the inherent lower cost level of a complete Amiga-for-television hardware system. As for software, that's an entirely separate matter, but it can produce extremely effective and professional results at a very attractive price. □

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AMIGA CONTROL

You've spent hours working to create magic on your Amiga. Finally you are satisfied with the graphics on your monitor screen. But when you transfer your work to videotape you are disappointed with the results. You might think your equipment is failing, that you bought the wrong equipment in the first place, or that you did something wrong. But why did everything look so right on the monitor? There is a easy answer to this question: graphics computers can create illegal chroma and luminance values when it comes to video.

Every normal monitor has its own characteristics, and so does every other link between the computer and a VTR. How can you predict that when everything is working together it will all fall into spec in the end? How can you ensure that you will attain the best possible results? It is possible that one part of your system might compensate for mistakes generated by another part (or, more likely, each mistake adds to next)? How do you know where it is right and where it is wrong? The answer is simple: Get in control!

You will probably want to use the Amiga monitor for reading your program's menus and text, because the lines and characters of most programs are only one pixel in width, and without antialiasing they do not translate clearly into NTSC video. Your first step should be to hook up the encoder to the Amiga and an NTSC video monitor to the encoder. Now you can work on the Amiga monitor and still see what the result will be on an NTSC monitor.

We have solved one problem but we still don't know if the RGB monitor has

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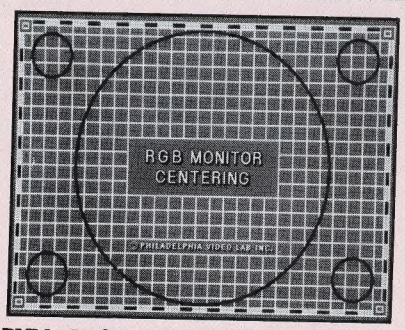
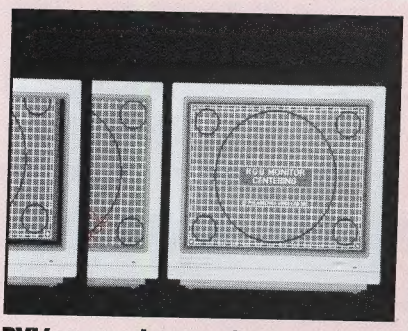
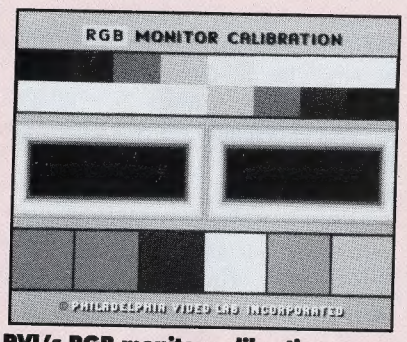


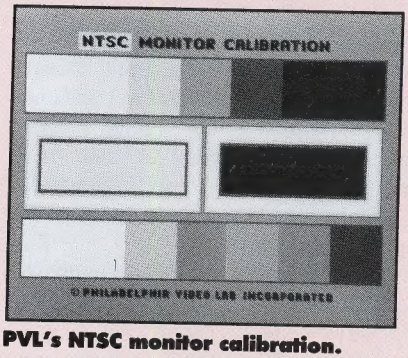
PVL's Amiga RGB monitor center screen.



PVL's manual screen for centering.



PVL's RGB monitor calibration.



PVL's NTSC monitor calibration.

the right set-up for brightness/contrast. In addition, is the NTSC monitor properly adjusted for phase and color saturation? (RGB monitors do not have the two latter settings.) We also don't know if the encoder is working right. Is there a shift of the image to one side or the other? It could be your computer, your encoder, or both. In most cases it is probably the computer. In the Amiga preferences there is a window for screen centering, but without giving a guideline how do you know where the center point is? Philadelphia Video Lab (PVL) offers a calibration program (see illustrations), which can solve your problems step by step, and finally put you in control.

PVL's program gives you the right test screens to help you adjust everything that you can adjust visually. But PVL's program is only part of the solution. It can not measure for you what has to be measured with a waveform monitor and a vectorscope. Those instruments are not only for engineers, they are there for all videographers. A videographics de-

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signer or video editor working without a waveform monitor and vectorscope is like an electrician trying to work without a volt meter! Kenwood has some very reasonably priced scopes on the market, and for extensive measurements companies such as Magni, Tektronix, and Leader Instruments offer much to choose from.

—PETER LULLEMANN

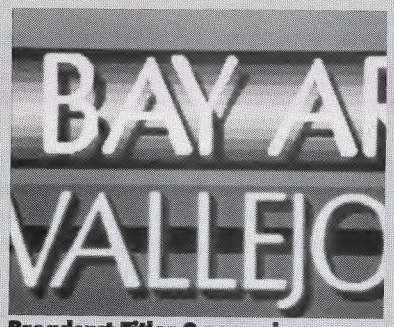
THE AMIGA AS A CHARACTER GENERATOR

Don't look now, but the Amiga is increasingly being used as a character generator (CG) in video production work ranging from the professional special-event market, to PBS stations, to corporate video, to cable TV. There is a valid reason for this. Not only is the Amiga modestly priced but over the years very powerful CG programs have been created specifically for this computer. Again, what set the Amiga apart from all other personal computers is its powerful graphics capability.

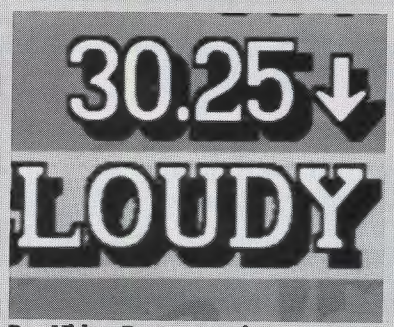
Think about some of the special CG computers in the industrial/broadcast market. For the same price that an entire Amiga system with CG software would cost, you are getting only reasonable characters, in terms of nanoseconds of resolution. With the Amiga, you can create your own graphics and backgrounds, and some of the CG programs available for this computer already have built-in ones.

Where you should not save money is on the encoder. The better the encoder the better your CG will be, providing you also choose the right CG software program, where the fonts are antialiased. Antialiasing is very important when it comes to characters because computers based on bitmapping (pixel resolution) can not display smooth diagonal and curved lines (like you find in the letters V or O.) In order to get the jaggies out, an antialiasing routine within the software program is used to fill in the pixel corners with pixels of a lesser graduated density. In high-end systems it is not only done in density but also in a color transition as well.

Nanoseconds of resolution, as mentioned earlier, is a common industry measurement for the quality (fine detail) of a CG for TV applications. Seventy nanoseconds of resolution is considered good enough for industrial applications; 40 nanoseconds and less is considered the minimum for broadcast quality fonts. I have never calculated an Amiga CG system in terms of nanoseconds of resolution, but based on past experience my guess would be 40 to 35 nanoseconds (provided the right software is used).



Broadcast Titler 2 zoom-in.



Pro Video Post zoom-in.

I remember very well my conversation with Jeff Karlin, co-founder of Shereff Systems, in Beaverton OR, the day the first Amiga 1000 came on the market. Out of pure curiosity I asked him "Why are you creating a CG program for a computer that doesn't have a real encoder to put the results on tape?" I recall his answer to be: "It will!"

How right Karlin was, we can see today. By being the first, and with all the years of his continual work, he has set a standard within the Amiga market for CG programs. His latest software release, Pro Video Post, also incorporates DVE effects.

Another remarkable CG program is from James Schneider, of InnoVision Technology, in San Leandro CA. The program, Broadcast Titler 2, works in hi-res and it has quite a unique feature—each text line can have its own adjustable 16-color palette. Which is the better program? My answer is a German phrase: "The one loves the mother, the other the daughter." Both are very good, and both work with the Amiga.

A good Amiga-based CG will cost somewhere between $3,000 and $5,000. It is possible to save a couple of dollars by going out and buying the various components that you need piecemeal. But you are on your own and there will be hardly any advice or service. Shereff Systems ([503] 626-2022) is selling and servicing turn-key systems. Those systems are priced from under $3,000 to under $5,000, including an encoder (normally a Digital Creations SuperGen, a nice little encoder, but for advanced video work ask for the optimum) as well as 84 generic backgrounds built-in. Of course, once you have the Shereff system and you would like to add or change the appearance of your characters you could always get a copy of Broadcast Titler 2 from InnoVision Technologies, for approximately $300, or any other program for that matter.

—PETER LULLEMANN.

THE AMIGA AS A 24-BIT PAINT SYSTEM

DCTV—The future is here.

The brochure reads: "Paint, digitize, and display full-color NTSC videographics on any Amiga. Capture a video frame in ten seconds from any color video camera. Also works with still video cameras, videodisc, and still-frame-capable VCRs. Display and capture full-color 24-bit high-resolution images. Convert DCTV images to or from any IFF display format (including HAM and 24 bit). Paint, digitize, and conversion software are all included. Works with all popular 3-D programs. Animate in full NTSC color. DCTV (Digital Composite Television) is a revolutionary new video display and digitizing system for the Amiga. Using the Amiga's chip memory as its frame buffer memory, DCTV creates a full-color NTSC display with all the color and resolution of television. Sophisticated true color video paint, digitizing, and image processing software are all combined into one easy-to-use package included with DCTV. It also works with all popular 3-D programs to create full-color animations that can be played back in real time. List price $495."

What you just read is not an editorial, it is an exact reprint of a Digital Creations advertisement. You're probably reacting to it as I did when I first read it. I thought *"At $495 how could it be more than just another one of those dreadful gadgets for the Amiga?"*

I paid no attention to DCTV until I had to write this article for VIDEOGRAPHY. I didn't want to leave out anything that might be worthwhile for the reader, so I called Digital Creations, in Rancho Cordova CA. The next day I

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had a little box in my hand. It was cutesy and colorful, so I laughed, but I stopped laughing as soon as I connected this cute little box to the Amiga. DCTV is definitely worth talking about.

My work at PVL (Philadelphia Video Lab) puts me in a strange world where I deal with both ends of the video spectrum. PVL does work in high-end broadcast video, and—at the other extreme—in consumer-level video on the Amiga. Being in this position gives me an advantage. I can be totally neutral and objective (as much as anyone can be) about the products that I use to make my living. So what is the true story about DCTV?

When I first started up the DCTV paint program and saw the main panel, I got the feeling that I was looking at a cross between the Dubner Turbo Paint System and a Quantel Paintbox. I found all the functions easy to get to. The way you can control the brush is outstanding; so are the stencil and mask functions. Since we are creating for video, the ability to work in video is a positive aspect. This way you can avoid making mistakes because you can see, in real time, how it will look on television or on videotape. For the most part the paint program behaves just like a high-end system.

(If you are used to a drawing tablet with a stylus and wish to replace your mouse, your wish can be answered. For around $600 Summagraphics and Kurta offer different kinds of drawing tablets with a stylus as well as a puck. Both tablets interface with the Amiga.)

This does not mean that I didn't find negative aspects to DCTV. It is a little bit confusing to learn how to use the stencil feature at first, but once you have it—you have it. Another problem is that the color ramps are not smooth if you try to make them too complicated. Here we see the cost-cutting beast raising its head. The problem is due to the fact that the built-in encoder is, unfortunately, of lower quality. Don't try to overlay your graphics with the text coming out of the program; it will look just awful.

Here is another example of brilliant ideas with sophisticated technologies, but then they leave out an important part that would make the product truly professional. I called John Botteri, president of Digital Creations, and asked him, "Why don't you combine a real encoder, like the one that comes with your

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SuperGen 2000S, together with DCTV, put them into a 19″ rack unit, and sell it for an appropriate price?"

Surprisingly, Botteri's answer was "We were thinking about it, but we wanted to give the Amiga community a tool to do 24-bit painting right now at a price that the majority could afford. Furthermore, the technology used in DCTV is just a small part of another unit that we are still in the process of developing. This other unit will eventually penetrate the professional market and revolutionize the way we think about 24-bit paint systems, and it will have DVE!" At this point I wanted to know more concerning DVE. What I learned from him was that they are planning to come out with a product called the V-Machine at the end of this year.

It will come in a 19″ rack-mount unit. The base configuration will have two built-in TBCs, with the option to plug in two additional TBCs. The unit will function as a normal video switcher but also as a true DVE, with effects similar to high-end products. It will feature fly-ins, true page peel, wrap-around, key frame animation, and full geometric remapping of the inserted image in any size and placement on the screen. You will be able to model what you want to do and save created effects that you can use for other projects with different images. To top it off, they will include the real paint program—one that is far more advanced than what comes with the DCTV unit. I then asked him about the encoder. "Yes, of course it will have a real encoder," Botteri answered, "but it will also have Betacam component in and out."

It sounds almost too good at the estimated price of around $6,000. Of course, DCTV is already the proof that the company has the technology, and with the V-Machine it can only get better. For now, and the rest of the year, we have DCTV to enjoy.

If you have not worked on a 24-bit paint system before it is worth the investment to learn now and get ready for the V-Machine, because the learning curve on any paint system is usually between 6 and 12 months, and once you understand the basics it is much easier to upgrade to a more sophisticated system.

At the PVL studio we wanted to find the limits of the DCTV unit as well as the Video Toaster's paint program. In order

DCTV paint panel, frame grab, and altered video images.

to test them on equal terms we picked one video frame to be altered by both systems. Naturally, if you sit for hours in front of the screen you at least want to look into a beautiful face. So the PVL staff decided to grab a frame of news anchor Lynne Russell, of *CNN Headline News*, for this test. Here is how it was done: The original image came from a Hi-8 tape recording off cable TV. It was frozen in the JVC F250 frame synchronizer and fed out to the Dubner, Video Toaster, and DCTV. Figure 1 shows the output from DCTV. (I should point out that these are not loop-through images.) They were first saved on disk and then recalled. Figure 2 shows the paint panel of DCTV and some of its drawing functions. You can see in this trial box how subtly you can control the brush, colormix, and smoothness. You can even create in water colors.

What about the problem with the encoder? It is okay for now. As all the images show, it is possible to get around the encoder problem by working in real time and checking your results in video.—PETER LULLEMANN

RECORDING DEVICES

Whatever your creation is, once it's finished on the Amiga you'll want to output it to videotape. You also might come from tape and want to overlay your graphics over live video and go back to tape. So what is the right recording device for you? There is no right or wrong recording device, it only depends on the quality you want to achieve and the money you can spend.

If you do mainly 3-D animation the most elegant solution would be to record in single frame onto the Sony CRVdisc, which is a component laserdisc recorder. But to do this you also need a single-frame edit controller, such as the BCD 5000 or Videomedia's V-Lan, and eventually you have to transfer the disc to videotape in real time.

If you are creating for the higher end of video production, but don't want to spend the money on such expensive VTRs as 1″ or Betacam SP there is another way to do it. Even in the higher end of the business I have seen situations where the created animation is first transferred on a lower-end tape format, such as ¾″ or S-VHS as a test. It is then shown to the client for approval. Once it is approved the animation is send out to a service bureau for transfer to any desired format. For this kind of approach there is now an excellent solution.

In a couple of months you will be able to buy the BR-S605U from JVC. The BR-S605U is an S-VHS recorder specifically designed with computer applications in

JVC's BR-S605U: Open architecture S-VHS VCR.

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mind. You can single step frame record without going through a controller. The BR-S605U has two built-in extension PWB slots, which can be used for either control or video. You can easily customize the recorder by inserting different cards, such as a 25-pin RS-232 serial remote control board. ASDG (Madison WI) currently produces an interface program that will be able to use the BR-S605U directly from the Amiga. ASDG also makes Amiga interface cards for connecting to scanners and other peripherals and software for image conversion and processing. If you ever need advice on interfacing the Amiga with any higher-end video equipment, call ASDG at ([608] 273-6585).

Although the BR-605U would be excellent for producing single-frame test tapes, it doesn't mean necessarily you can not use them as a final product, but the BR-605U is not meant to be an editing recorder. I have frequently been asked "What would be the entrance level into professional video recording?"

My answer is: "So long as you have a clean signal going to the recorder, it is not so much the recording and format itself, as it is the playback—the recovering of the recorded video signal."

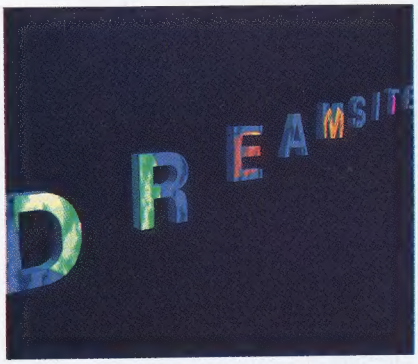
Following this thought and answering the question: "What is the entrance level?" My answer is "Look into JVC 11 series professional S-VHS machines."

—PETER LULLEMANN

Amiga Amigos

BY MICHAEL GROTTICELLI

Anyone who still doesn't understand that the Commodore Amiga is a professional video production tool needs only to look at who's using it to be convinced. From high-end corporate production to the special-event videography market, the Amiga computer can be configured as an effective system for everything from paint and 3-D animation to effects and editing. Increasingly, videographers at all levels are using the Amiga to achieve new levels of creativity, efficiency, and production value. Here are profiles of some leading Amiga video professionals.



Oh Nooo—Walter Williams' animated company logo.

Walter Williams
Dreamsite Productions
Hollywood CA
(213) 876-7801

Always on the creative edge, independent writer/director/producer Walter Williams, best known as the creator and producer of *Saturday Night Live*'s "Mr. Bill Show" (shot initially on Super-8 film and then later on 16mm), is currently using an Amiga 2000 with a Great Valley Products accelerator—in tandem with a NewTek Video Toaster for effects and character generation, and RGB Computer & Video's AmiLink/VT software for A/B roll offline editing—for a series of short videos that appear on ABC's *Into The Night* program starring Rick Dees. Williams' home studio also includes a Hewlett-Packard Laser Jet III laser printer, two I.Den TBCs, two Panasonic 75010 S-VHS playback VTRs, one Panasonic 1750A editing VTR, one multiscan monitor and three color monitors, an audio mixer, and a host of accessories.

"A lot of the projects that I work on don't have large budgets, so the Amiga allows me to produce very cost-effectively," he said. "Also, it gives me a lot of control over my designs and how the finished product will look. I'm able to do things, like animated bumpers, that would not be able to be done on a modest budget with traditional video equipment. I like working on the Amiga because I'm able to do everything myself, and many of the techniques I've learned on the Amiga are applicable to most of the higher-end systems."

Williams states that designing and editing on the Amiga allows him to work at home, experiment as much as he'd like without a time constraint, then go into a commercial post house for finishing work. For *Into The Night*, Williams usually shoots 16 and Super-8 film footage, transfers it to Betacam SP—along with an S-VHS dub of the time code—and offline edits at home on his Amiga. He then takes his EDL on a disk to either Premore or The Post Group in Hollywood for online assembly (on Betacam SP) and output onto 1."

"My original reason for getting the AmiLink system was for editing offline," Williams explains, "but now with the Toaster I'm able to online pieces that I shoot in S-VHS. The AmiLink/VT version actually runs the Toaster so I can do A/B roll editing between two playback decks, as well as dissolves, page turns, and character generation. Producing on the Amiga enables me to save money on the budget to devote to other pieces."

Williams works with a producer and an art staff, but he does virtually all of the editing, directing, and script supervising himself. "Working on the Amiga provides me the luxury of time and complete creative control when working on projects," he said. "There are so many other things I can do with the Amiga as well, such as 3D animation. And, with my Video Toaster hooked up to the AmiLink, I can do single-frame animation without having to add any additional equipment. I'm quite pleased with the system's flexibility and ability to grow as my needs require."

for all aspects of his business, such as scripting, budgeting, and accounting. In addition, with the multitasking capabilities of the Amiga platform, he can work on selected sections of a project while the Amiga is rendering and compiling animations in the background. His original Amiga 1000 is still being used as a dedicated cuts-only offline editing system, used to generate graphics, slates, titles, and edit lists. Desert Sky's impressive client reel includes: a documentary on General Motors' solar-powered race car, a live presentation for the Miller Brewing Company's annual distributors' convention, and a series of music instruction videos for Cherry Lane Music.

"The support of the Amiga community is one of the major assets in working with this platform," Carey concludes. "There is an undeniable feeling that we have the best computer system for video production. I have found most of the Amiga programs accessible and very open to end-user suggestions. I recently had a problem with Mike Berro's (Microillusions) edit decision list processor. I called him up, explained the problem, and within two days had a 'custom' upgrade in my hand."

The Amiga 2500 (top left), just one of the crowd, at HP control room.

John Vernon
Hewlett-Packard ITE Net
Cupertino CA
(408) 447-1380

An Amiga 2500 works within a full-blown control room at Hewlett-Packard (HP)'s ITE (Interactive Technical Education) Net, which produces technical training and communications programming for live satellite broadcast to the company's support engineers and salespeople throughout the U.S. and Canada. HP video producer John Vernon explains that his division has interfaced an Amiga into their entire production facility so that it serves as a routable source through their Grass Valley Group 100 switcher. Graphics and effects created on the Amiga can be routed to anywhere within the facility, e.g. their still store, EMC^2 editing system, Ampex ADO, or out to Betacam as a final master.

Vernon had been looking for a good way to illustrate the complex subject matter presented by HP when he chose the Amiga. "I have a love for animation, and had been doing some things on my own. I knew that what we needed here was a low-cost way to animate the static graphics being presented. One of the ways to do it was with bit maps and computers. At the time the Amiga was the best platform to manipulate bit maps easily and effectively. Also, at the time finding a decent genlock card was a very

(continued from page A8)

render, so jobs can be split up between multiple systems for faster rendering; and the ability to render in resolutions of 512 × 482 and 1024 × 482 (Imagine also currently supports the BCD 5000 single-frame edit controller).

The list continues with a 24-bit high resolution display card called the Firecracker24, also from Impulse. The output of this card is only in RGB, but transcoding—rather then encoding—into component and recording on Betacam SP yields high-quality broadcast results and this makes the Amiga shine like a high-end computer system. Although the software may not have all the features and sophistication of a Wavefront at this time, the fact that it can even be compared to such a system is astounding. I would say that to compare Imagine to anything less would be doing it a disservice.

If you are serious about 3-D rendering and animation, here is something to dream of—a run-down of the 3-D animator's affordable full 3-D system.

For creation and storage: one 68030- or 68040-based Amiga computer; one IVS (Interactive Video Systems, Garden Grove CA) Grand Slam multifunction card with 8 MB of RAM; one Seagate 330 MB or 620 MB hard disk drive; one Sony BVM 1915 monitor or JVC VM-R190SU; one Epson flatbed scanner; one Kenwood waveform monitor; one Kenwood vectorscope; one Sony Magnum/650 with 650 MB removable 5.25" disk, for data backup and archival purposes; one Impulse Firecracker24 display board; and one Impulse Imagine software package.

For image rendering: three 68030- or 68040-based Amiga computers for independent frame rendering; three IVS Grand Slam multifunction cards with SCSI-Share network; one Seagate 620 MB hard disk drive for shared frame storage.

For video recording in single frame: one BCD 5000 single-frame editing controller; one Sony CRVdisc component video recorder.

The price tag for this complete high-end 3-D animation studio would be around $61,000.

Let's say you already have a Betacam SP recorder as a substitute for the Sony CRVdisc recorder, plus you have the

Off Betacam SP video image.

right monitor, waveform monitor, and vectorscope. Then you would need an additional transcoder or encoder, but you could deduct about $23,000 from this amount, and your 3-D studio could be realized for around $38,000. The reason I include the Sony CRVdisc component video recorder on the list is very simple: Time is money, and time is saved by using the Sony CRVdisc because there is no pre-roll. It provides instant recording of each frame and you don't need an encoder or transcoder because you can feed RGB directly. If you have a question related to the computer hardware configuration, hard disk drive, or multifunction card give IVS a call ([714] 890-7040). Shared peripherals will cut production cost.—PETER LULLEMANN

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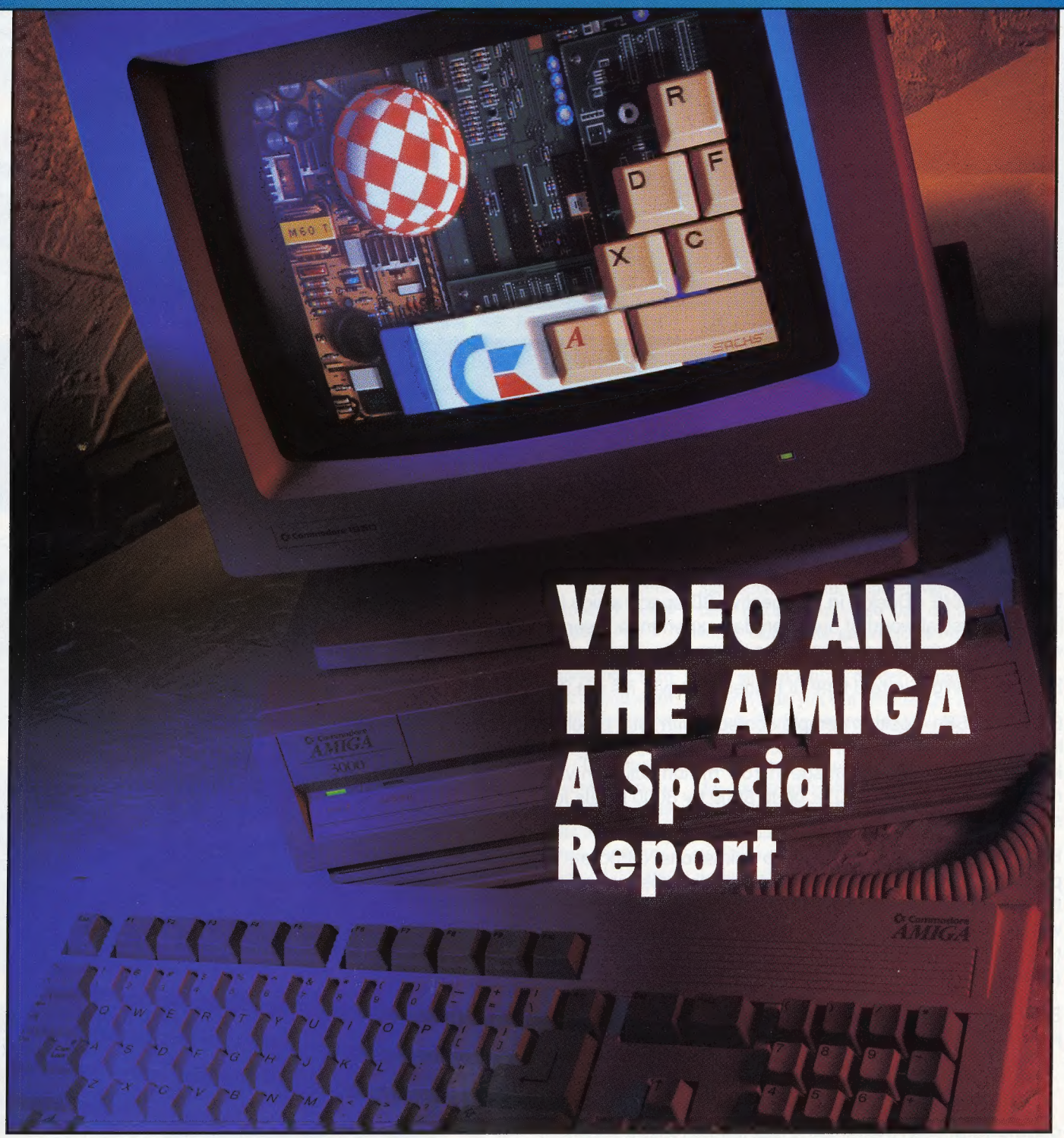

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A Special Report